

Heat Stress Mitigation For Construction Projects

Department of Energy
Integrated Safety Management
Workshop
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Introduction

- Welcome
- Background of Project W-314
- Application and Success of ISMS to Project W-314

Speakers

- Craig Upchurch
 - Radiological Controls Project Manager for the W-314 Project
- Rob Brooks
 - Lead Health Physics Technician for W-314

W-314 Background

- Multi-year project to upgrade the Tank Farms at Hanford.
 - Initial Tank Farm construction was started in 1944.
 - 177 interconnected underground tanks ranging in size from 55,000 to 1.2 million gallons.
 - Store, retrieve, and dispose of liquid wastes from spent fuel processing.

W-314 Background Cont.

- Upgrade of tank transfer lines and support systems to current engineering and environmental standards.
- Support clean-up of Hanford.
- Provide transfer route for final disposal to Vitirification Plant.

Hazards of W-314

- Construction hazards.
 - Trips and Falls.
 - Live loads (crane).
 - Excavations.
 - Heat, heat, heat and more heat.

W-314 Work Construction Site



W-314 Hazards

- High risk of heat stress.
- Work productivity about 4 hours/day due to heat.



Identify Solutions

- Meet with Workers and Industrial Safety & Health Professionals.
- Brainstorm Solutions.
- Analyze Solutions.
- Apply Solutions.
- Feedback and Improvement.

Brainstorm Solutions

- Work graveyard shift.
- Keep current work regimens.
- Hire more personnel.



Analyze Solutions

- Graveyard Shift.
 - Disruption of family and personal life.
 - Health problems, including gastrointestinal disorders and chronic fatigue.

Analyze Solutions Cont.

- Keep current regimen.
 - Heat stress problems not resolved. Workers still at risk.
 - Schedule couldn't be met.

Analyze Solutions Cont.

- Hire more workers.
 - Heat stress problems not resolved. Workers still at risk.
 - Less efficient. Current facilities unable to support more personnel.

Best Solution

- Keep current shift.
- Apply engineered controls.
 - Controls researched and developed by the workers who would use them.
 - Workers helped choose the brands of equipment utilized.
 - Increased satisfaction when workers are actively involved.

Engineered Controls

- Cool vests.
- Air system developed by workers.
- Air vests for cooling.
 - Use of water resistant, breathable suits in lieu of plastic suits.
 - Supplied cool air through use of 55 gallon drums containing ice.

Engineered Controls Cont.

- Soft hats with gel beads.
- Break areas.
 - Nearby work locations.
 - Water provided.
 - Shaded.

Engineered Controls Cont.

- Shading of work locations and containment tents.
- Use of misters between the tent and shade.
- Use of demister fans to provide evaporative cooling to workers in the trenches.
- Use of air conditioning to containment tents.

Implementation



Implementation Cont.



Implementation Cont.



Implementation Cont.



Feedback and Plan for the Future

- Regardless of current success, strive for improvement next summer.
- Continue to solicit new ideas from workers and professionals.
- Do not become complacent.

Feedback and Plan for the Future Cont.

- Provide atmosphere for safety improvement suggestions.
- Recognize the only bad idea was the one that wasn't suggested.

Closing

- Working in a high heat environment can present unique challenges. Challenges that can be overcome by a commitment to listening and the application of the ISMS principles.